

DETAILED ACTION

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A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/14/2010 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claim 1-2 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant admitted prior art further in view of Raszuk et al. (US Patent 7535828 B2) and further in view of Oyamada et al. (US Publication 2003/0031125 A1).
2. In regards to claim 1, the applicant admitted prior art teaches that the PE-E re-selects the VPN v4 route advertised by the PE-B (selecting, by the double-ascription PE of the remote CE, the available tunnel). Furthermore, the forwarding engine forwards the service according to the new routing information, thereby implementing the end-to-

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end service convergence (forwarding, by the double-ascription PE of the remote CE, service according to the routing information of the available tunnels selected)(See paragraph 13 on page 3 of the specification)

3. In further regards to claim 1, the applicant admitted prior art teaches, the PE-E can detect the malfunction of PE-A only through information such as an outer layer LSP tunnel is unavailable (detecting, by the double-ascription PE of the remote CE a tunnel state) (see paragraph 13 on page 3 of the specification).

4. In further regards to claims 1 and 11, the admitted prior art shows in figure 1, a PE-E that is a double ascription PE for a remote customer edge CE-A. Furthermore, PE-E fills in a forwarding item used by a forwarding engine only the routing information advertised by the PE-A, such as a forwarding prefix, an inner layer label, a selected outer layer tunnel, etc. Then the forwarding engine forwards the service according to the routing information (setting and storing routing information of one tunnel by a double-ascription Provided Edge of a remote CE in the double-ascription PE itself, wherein an initial node of the tunnel is the double-ascription PE of the remote CE, and a terminal node of the first tunnel is a PE which is connected with the remote CE respectively) (see paragraph 11 on page 2 of the specification). When the terminal node PE-A of the tunnel malfunctions, PE-E re-selects the VPN V4 route advertised by the PE-B and fills in the forwarding item of the forwarding engine with the new routing information (setting and storing routing information of a second tunnel by a double-ascription Provided Edge of a remote CE in the double-ascription PE itself, wherein an initial node of the tunnel is the double-ascription PE of the remote CE, and a terminal

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node of the second tunnel is a PE which is connected with the remote CE respectively) (see paragraph 13 on pages 2-3 of the specification).

5. However the admitted prior art fails to teach storing or setting routing information and tunnel state information for at least two tunnels of a remote customer edge (CE); where the routing and tunnel state information are stored in one route forwarding table.

6. Raszuk however teaches, a label forwarding table, 500 that includes a plurality of table entries 510, each of which is configured to store a prefix value 520, a VPN label value 530, a VRF identifier value 540, a backup PE device identifier 570 and a backup MPLS label stack 580 (see column 15, lines 17-33).

7. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to incorporate the use of a forwarding table 500 as taught by Raszuk in to the teachings of the applicant admitted prior art. The motivation to do so would be to allow for a consolidated forwarding table.

8. In further regards to claims 1 and 11 the admitted prior and Raszuk fail to teach detecting the state of both of the at least two tunnels, selecting, the one or more available tunnels according to the state of each tunnel for the at least two tunnels.

9. Oyamada however teaches in figures 13 and 16, a tunnel table having at least two tunnels with the status (state) of the tunnels and in figures 17, 18 and 19 shows, detecting the state of the tunnels and selecting a tunnel based on the status of tunnel number 1 and tunnel number 2 and communication is continued on the selected tunnel (reads on forwarding according to the state of each tunnel from the at least two tunnels).

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10. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to incorporate the use of the tunnel table as taught by Oyamada into the teachings of the applicant admitted prior art and Raszuk. The motivation to do so would be to allow for efficient rerouting in the event of a failure of a first path.

11. In regards to claim 2, the applicant admitted prior art teaches, the inner tunnel being a VPN tunnel (see specification paragraphs 11, 13 and 15) and the outer tunnel being an LSP tunnel (see paragraph 14 of the specification).

12. Claim 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant admitted prior art further in view of Raszuk et al. (US Patent 7535828 B2) and further in view of Oyamada et al. (US Publication 2003/0031125 A1) and further in view of Filsfils et al. (US Publication 20060193248 A1).

13. In regards to claims 3 and 4, the applicant admitted prior art in combination with Raszuk and Oyamada teaches all the limitations of parent claims 1-2. The applicant admitted prior art also teaches a double-ascription PE of a remote CE setting routing information as mentioned with regards to claim 1. However the applicant admitted prior art, Raszuk and Oyamada fail to teach, setting optimal routing information and suboptimal routing information of the tunnels in the route forwarding table according to pre-configured matching strategies and setting a suboptimal routing information in the route forwarding table.

14. Filsfils however teaches the table 500 (from Filsfils) in addition to a VPN label column 530, also contains back up PE device column 570 and backup label stack

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column 580 (sub optimal routing information). The IGP label value may be determined based on the contents of a separate label forwarding table configured (pre-configured matching strategies) to store IGP label information used to forward data packets within the provided network 110 (see paragraph 58 on page 7).

15. Furthermore, in regards to claim 4, the FRR enable flag 550 (in Filsfils), stores a value indicating whether FRR operation are currently being performed for data packet having VPN label values and destination IP addresses that match the contents of the table entry 510. When the operating system 460 detects a node or link failure over a PE-CE data link, the operating system sets the FRR enable flag values for those IP address prefixes 520 that were reachable over the failed PE-CE link (see paragraph 56 on page 6).

16. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to incorporate the use of a table as taught by Filsfils into the teaching of the applicant admitted prior art, Raszuk and Oyamada. The motivation to do so would be to allow for a more comprehensive tunnel table with link failure status.

17. Claims 5-9 and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant admitted prior art further in view of Raszuk et al. (US Patent 7535828 B2) and further in view of Oyamada et al. (US Publication 2003/0031125 A1) and further in view of Gouge et al. (US Patent 7343423 B2).

18. In regards to claim 5, the applicant admitted prior art, Raszuk and Oyamada in combination teach all the limitations of parent claims 1-2. The applicant admitted prior

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art and Oyamada however fail to teach, advertising the availability/unavailability of the tunnel through a tunnel fast convergence technique.

19. Gouge however teaches the above-mentioned limitation. Gouge teaches a routing processor 202 which notifies all line cards 108 of a link failure in an LSP when one line card 108 detects a failure (see column 6, lines 56-67).

20. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to incorporate the failure notification taught by Gouge into the teachings of the applicant admitted prior art, Raszuk and Oyamada. The motivation to do so would be to protect all LSPs which use a failed link because all LSPs that use a failed link will also fail.

21. In regards to claims 6-7, the applicant admitted prior art, Raszuk, Oyamada and Gouge teach all the limitations of parent claims 1-2 and 5. The applicant admitted prior art, Raszuk and Oyamada fail to teach updating the tunnel state information in a forwarding table or a storage unit.

22. Gouge however teaches the above-mentioned limitation in step 404 where each line card 108 sets its global fix-up flag if it not already set to indicate that there is now an active rewrite process for adjacency information in forwarding table 302 (see column 6, lines 66-67 and column 7, lines 1-2).

23. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to incorporate the failure notification taught by Gouge into the teachings of the applicant admitted prior art, Raszuk and Oyamada. The motivation

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to do so would be to protect all LSPs which use a failed link because all LSPs that use a failed link will also fail.

24. In regards to claims 8 and 12-13, the applicant admitted prior art, Raszuk, Oyamada and Gouge in combination teach all the limitations of parent claims 5-6. The admitted prior art teaches a double ascription PE of a remote CE forwarding the service to the remote CE. The admitted prior, Raszuk art and Gouge fail to teach, obtaining and judging the state information of the primary tunnel and if the primary tunnel is available, selecting the primary tunnel and if the primary tunnel is not available, selecting the backup tunnel.

25. Oyamada however teaches in figures 17 and 19, checking the status of the primary tunnel (step s32) and if active chooses the primary tunnel (step s34) and if not active chooses the backup tunnel (step s36).

26. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to incorporate the use of the tunnel table as taught by Oyamada into the teachings of the applicant admitted prior art, Raszuk and Gouge. The motivation to do so would be to allow for efficient rerouting in the event of a failure of a first path.

27. In regards to claims 9 and 14-15, the applicant admitted prior art, Raszuk, Oyamada and Gouge in combination teach all the limitations of the parent claims. Oyamada teaches the status of the tunnel in figures 13 and in figures 17 and 19 transmitting on the backup tunnel if the primary tunnel is not available. However Oyamada fails to teach, confirming the status of the backup tunnel.

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28. Gouge teaches the above-mentioned limitation at step 512 of figure 5 where a determination is made to see if the backup tunnel active table entry is set.

29. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to incorporate the failure notification taught by Gouge into the teachings of the admitted prior art, Raszuk and Oyamada. The motivation to do so would be to protect all LSPs which use a failed link because all LSPs that use a failed link will also fail.

30. Claims 10 and 16-17, are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant admitted prior art further in view of further in view of Raszuk et al. (US Patent 7535828 B2) and further in view of Oyamada et al. (US Publication 2003/0031125 A1) and further in view of Gouge et al. (US Patent 7343423 B2) further in view of Filsfils et al. (US Publication 20060193248 A1) and further in view of Christie (US Patent 7646710 B2).

31. In regards to claims 10 and 16-17, the applicant admitted prior art, Raszuk, Oyamad and Gouge teach all the limitations of the parent claims. The applicant admitted prior art further teaches the double ascription PE of a remote CE selecting a tunnel and Oyamada teaches choosing a tunnel also as stated above. However, neither of the above-mentioned references teaches, if it is determined that one of the tunnels is unavailable while others are available according to the state information, of the mutual load sharing tunnels, forwarding the service to the remote CE through the available tunnel.

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32. Filsfils however illustrates the operation in figure 7. At step 720, if the FRR is not enabled (obtaining the state of the primary tunnel and judging that the primary tunnel available), the packet is forwarded using the received VPN label value (forwarding the service to the remote CE through the primary tunnel).

33. If at step 720 in Filsfils, if the FRR is enabling (primary tunnel is not available), after subsequent steps, the packet is forwarded through a backup PE device at step 755.

34. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to incorporate the use of a table as taught by Filsfis into the teaching of the applicant admitted prior art, Raszuk, Oyamada and Gouge. The motivation to do so would be to allow for a more comprehensive tunnel table with link failure status.

35. In further regards to claims 10 and 16-17, the applicant admitted prior art, Raszuk, Oyamada, Filfils, and Gouge fail to particularly teach load sharing tunnels.

36. Christie however teaches tow tunnels in a load-sharing mode for increased bandwidth (see column 4, lines 25-34).

37. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to incorporate the use of load sharing tunnels as taught by Christie into the teachings of AAPA, Raszuk, Oyamada, Filfils and Goughe. The motivation to do so would be share bandwidth between two tunnels.

Response to Arguments

Applicant's arguments filed 4/6/2011 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAY P. PATEL whose telephone number is (571)272-3086. The examiner can normally be reached on Mon.-Thurs.: 8:00 a.m.- 6:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel J. Ryman can be reached on (571)272-3152. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner, Art Unit 2466

/Daniel J Ryman/
Supervisory Patent Examiner, Art Unit 2466

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